



First Appearance of the Brahminy Blindsnake, *Virgotyphlops braminus* (Daudin 1803) (Squamata: Typhlopidae), in North America, with Reference to the States of Mexico and the USA

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The Brahminy Blindsnake (*Virgotyphlops braminus*, Figs. 1 & 2) is the smallest and most widely distributed vertebrate, the most successful invasive herpetological species, and the most frequently introduced parthenogenetic reptile in the world (Bomford et al. 2009; Grace and Grace 2015; Mahoney et al. 2015). It has now reached at least 118 countries and island territories on every continent (except South America and Antarctica) and inhabits no fewer than 543 islands (Wallach 2020a).

Some 15 years passed from the first observation and collection of the little Indian snake, which Russell (1796) called the *Rondoo Talooloo Pam*, until it was formally described and christened *Eryx braminus* by Daudin (1803). Another quarter century passed before Cuvier (1828), realizing that boids and scolecophidians were not related, transferred *braminus* to the genus *Typhlops*, where it remained for nearly 140 years until Robb (1966) established *Ramphotyphlops* for the Australasian typhlopids with eversible hemipenes and retrocloacal sacs.



Fig. 2. A Brahminy Blindsnake (*Virgotyphlops braminus*) from Seminole, Pinellas County, Florida. This snake is about to shed, which accounts for the blue-gray coloration. Photograph by Kenneth L. Krysko.



Fig. 1. A Brahminy Blindsnake (*Virgotyphlops braminus*) from Port St. Lucie, St. Lucie County, Florida. Photographs by Kenneth L. Krysko.

Lack of hemipenial data for *braminus* resulted in its transference to *Ramphotyphlops* based on geography. Only eight years later, McDowell (1974) transferred *braminus* to *Typhlina* based on an earlier synonym for *Ramphotyphlops*, but it reverted back to *Ramphotyphlops* when it became known that *Typhlina* was a preoccupied genus (Williams and Wallach 1989; Wallach 2009). The molecular study of Hedges et al. (2014), which broke up the cosmopolitan genus *Typhlops* into numerous genera, resulted in *braminus* becoming *Indotyphlops*

braminus. Most recently, Wallach (2020b) transferred *braminus* to a newly created genus *Virgotyphlops* in recognition of its obligate parthenogenetic nature.

The data collected for the two tables summarizing the invasions of Mexico and the USA by Brahminy Blindsnakes emanated from four types of sources: the primary literature, natural history collections, online databases, and social media. A complete listing of sources is in Wallach (2020c). Museum acronyms follow Wallach et al. (2014) except for:

Table 1. Data on the invasion of México by Brahminy Blindsnakes (*Virgotyphlops braminus*) arranged chronologically from earliest to latest appearance. Columns contain the state, followed by the known minimum (Min.) and maximum (Max.) elevation in meters, the first date it was observed or reported, the earliest known museum voucher, and the reference of its first verified publication.

State	Elevation		First Date	Earliest Voucher	First Publication
	Min.	Max.			
Guerrero	12	2,159	1891	ZMUC 52172	Shreve 1938: 144
Michoacán	22	1,900	1913	BMNH 1914.1.28.120–1	Smith and Taylor 1945: 19
Sinaloa	0	389	1961	UCLA 14693	Campbell and Howard 1962: 202
Baja California Sur	19	123	1963	BYU 22441	Murphy and Ottley 1979: 119
Morelos	1,015	2,620	1965	FMNH 154799	Dixon and Hendricks 1979: 36
Querétaro	757	1,920	1971	SAM 1185	Cervantes and Minton 1975: 117
Jalisco	11	2,414	1991	UNAM-MZFC 4754	Dundee and Flores-Villela 1991: 26
Veracruz	0	1,426	1993	MZFC 5480	Mendoza-Quijano et al. 1993: 110
Oaxaca	24	2,015	1993	UNAM-MZFC 6009	Mendoza-Quijano et al. 1994: 34
Puebla	1,236	2,150	1993	EBUAP 930033	Eliosa-León et al. 1995: 110
Aguascalientes	1,550	1,900	1993	UAA-VR 254	Vázquez-Díaz and Quintero-Díaz 2001: 279
Nuevo León	361	909	1995	ENCB-IPN	Alvarez and Murillo 1996: 1–2
Distrito Federal	2,249	2,376	1995	IBH 11281	Mancilla-Moreno and Ramírez-Bautista 1998: 54
San Luis Potosí	127	1,874	1996	IIZD 206	Campillo-García 2013: 26, 40
México	1,740	2,367	1997	IBH 11307	Valdespino and García-Collazo 2000: 186
Quintana Roo	5	20	1998	ECO-CH-H 530	Cedeño-Vázquez et al. 2003: 394
Durango	1,125	1,928	1999	CIIDRUD 502–3, 535	Guzmán and Muñiz-Martínez 1999: 2
Tamaulipas	82	427	2004	UTA 53054	Farr et al. 2013: 635
Campeche		3	2005	UNAM-MZFC 18282	Solano-Zavaleta et al. 2006: 500
Nayarit	8	612	2007	UNAM-MZFC 6148–9	Quijada-Mascareñas and Canseco-Marquez 2007: 490
Sonora	229	1,194	2007	UNAM-MZFC 6147	Quijada-Mascareñas and Enderson 2007: 490
Tabasco	7	19	2007	INIRENA 678	Paz-Gutiérrez et al. 2008: 373
Hidalgo	1,308	1,930	2008	CIB 2346	Hernández-Salinas and Ramírez-Bautista 2010: 519
Yucatán	4	23	2009	MCZ Herp. Obs. 27	Paradiz-Domínguez 2016: 630
Chiapas	117	184	2010	MCBFESI 254	Hernández-Ríos and Trejo-Perez 2010: 622
Chihuahua		1,440	2015	SDSNH-PC 5274–6	Carbajal-Márquez et al. 2015: 573
Baja California Norte	9	104	2015	UABC 2205	Valdez-Villavicencio et al. 2016: 205
Zacatecas		1,902	2015	SDSNH-PC 5301	Bañuelos-Alamillo and Carbajal-Márquez 2016: 204
Coahuila	1,543	1,729	2016	Naturalista, 6.vii.2016	Wallach 2020a: 78
Guanajuato	1,628	2,022	2018	iNaturalist, 14.vi.2018	Wallach 2020a: 79
Colima	15	502	2019	iNaturalist, 20.x.2019	Wallach 2020a: 79

Table 2. Data on the invasion of the USA by Brahminy Blindsnakes (*Virgotyphlops braminus*) arranged chronologically from earliest to latest appearance. Columns contain the state, followed by the number of known counties, the known minimum (Min.) and maximum (Max.) elevation in meters, the first date it was observed or reported, the earliest known museum voucher, and the reference of its first verified publication.

State	Counties	Elevation		First Date	Earliest Voucher	First Publication
		Min.	Max.			
Hawaii	6	0	3,049	1927	BPBM 1588	Slevin 1930: 158
Florida	42	0	57	1979	AUM 32681	Wilson and Porras 1983: 55
Ohio	1	202	202	1985–89	CMNH 12074	OPLIN 2003: 1
Massachusetts	3	8	305	1990	MCZ 191202	Wallach et al. 1991: 68
Louisiana	5	0	11	1993	LSUMZ 56317	Thomas 1994: 34
North Carolina	1	105	105	1994	NCSM 78302	Beane et al. 2010: 6
Texas	12	1	204	1998–99	TCWC 84546	Bartlett 1998: 38
Virginia	2	11	50	2000	USNM 546147–51	Savitsky et al. 2002: 150–151
California	6	16	194	2000	CAS 244221	Palmer and Fisher 2010: 518
Arizona	3	330	724	2002	MCZ 189083	Servoss et al. 2013: 477
Minnesota	1	256	256	2004	?	Hahn 2004: 1
Georgia	6	4	111	2005	GMNH 50035–41	Jensen 2007: 490
Alabama	2	18	30	2005	? JSU	Mitchell 2017: 1–2
D.C.	1	30	30	2010–15	?	Murphy 2015: 128
South Carolina	1	2	2	2017	iNaturalist, 14.viii.17	Wallach 2020a: 79
Maryland	1	127	127	2018	HM 239347	Wallach 2020a: 79
Mississippi	1	248	284	2020	MMNS	Wallach 2020a: 79

AUM = Auburn University Museum of Natural History, CIB = Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, CIIDRUD = Centro Interdisciplinario de Investigación para el Desarrollo Regional, Unidad Durango, ECO = El Colegio de la Frontera Sur, Unidad Chetumal, ENCB = Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, GMNH = Georgia Museum of Natural History, IBH = Instituto de Biología, Universidad Autónoma de México, IIZD = Instituto de Investigaciones de Zonas Desérticas, Universidad Autónoma de San Luis Potosí, MCBFESI = Museo de las Ciencias Biológicas “Enrique Beltrán,” FES-Iztacala, MMNS = Mississippi Museum of Natural Science, NCSM = North Carolina State Museum, SAM = Sherman A. Minton private coll., UAA = Universidad Autónoma de Aguascalientes, UABC = Universidad Autónoma de Baja California, and UCLA = University of California at Los Angeles.

The first record of *Virgotyphlops braminus* in the New World, dating from 1891, was based on a specimen collected by S. Silldorff in Acapulco, Guerrero, Mexico on 5 September 1891 (ZMUC 52172). It first was reported in the literature by Shreve (1938), and Taylor (1940) hypothesized that *V. braminus* was inadvertently transported to Acapulco by the Spanish galleon trade between the Philippines and Mexico.

It next was reported from Michoacán by Gadow (1913), and the earliest traceable voucher specimens are a pair collected in Carrizal on 28 January 1914 (BMNH 1914.1.28.120–121). In the succeeding century, *V. braminus* has been reported from all 32 states in Mexico (Table 1 lumps the newly recognized state of Mexico City together with the Distrito Federal where it was previously administered). Maximum known elevations are in Morelos at 2,620 m, in the Distrito Federal at 2,376 m, in México at 2,367 m, in Jalisco at 2,414 m, in Puebla at 2,150 m, and in Guanajuato at 2,022 m. Not surprisingly, the lowest maximum elevations occur in the Yucatan Peninsula with 3 m in Campeche, 20 m in Quintana Roo, and 23 m in Yucatán (Table 1).

Brahminy Blindsnakes have been documented from one-third of the states in the USA (Table 2). Hawaii holds the distinction for the first appearance of *V. braminus* in the USA with the importation in the 1920s of palm trees from the Philippines to landscape the Kamehameha Boys' School (now Bernice P. Bishop Museum) in Honolulu (Fisher 1948; Hunsaker and Breese 1967). The earliest voucher was collected by W.E. Bonsey on 1 October 1927 (BPBM 1588) and identification was derived from material collected by P. Gantt in January 1930 (Slevin 1930). This snake also possesses the highest recorded elevation of 3,049 m in Haleakala

National Park on Maui. In the continental USA, *V. braminus* was first recognized in 1979 in Florida (AUM 32681) and the first published report followed four years later (Wilson and Porras 1983). Since then, it has dispersed to another 15 states for a presently known total of 17, encompassing 94 counties and occurring on 33 islands (nine Hawaiian islands and 24 Keys in southern Florida).

Virgotyphlops braminus almost certainly inhabits new regions of which the scientific and lay communities are unaware. Since *V. braminus* is a fossorial, nocturnal, and extremely small serpent, it is rarely observed during the day and, because it superficially resembles an earthworm, when excavated or uncovered, it is not always recognized for the snake that it is. Closer inspection, however, will reveal smooth glossy scales, tiny eyes, a protrusible tongue, and rapid movement on a surface in a wriggling snakelike manner.

Everyone who comes across one of these snakes is urged to photograph or collect it and submit documentation to an appropriate agency (i.e., museum, online database, or social media). Due to several unique features of the snout, and other characters in combination, *V. braminus* can be positively identified from a photograph (unlike nearly all other scolecophidians that must be preserved and have their scales examined and counted under a microscope; Wallach 2020b).

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